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TITLE

The relationship between adult attachment and coping with brain tumour: the mediating role of social support

RUNNING TITLE

Attachment, social support and coping with a brain tumour

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ABSTRACT

Objective

A primary brain tumour diagnosis is known to elicit higher distress than other forms of cancer and is related to high depressive symptomatology. Using a cross-sectional design, the present study explored how individuals cope with this diagnosis using an attachment theory framework. Attachment anxiety and attachment avoidance were hypothesised to be positively related to helplessness/hopelessness, anxious preoccupation and cognitive avoidance, and negatively related to fighting spirit and fatalism coping. We proposed perceived social support to play a mediating role in those associations.

Methods

Four hundred and eighty participants diagnosed with primary brain tumours completed the Mini-Mental Adjustment to Cancer Scale (Mini-Mac), the Experiences in Close Relationships Questionnaire–Revised (ECR-R) and the modified Medical Outcomes Study–Social Support Scale (mMOS-SSS) online.

Results

Lower perceived social support mediated the positive associations between both higher attachment anxiety and avoidance and higher helpless/hopeless coping. Attachment anxiety was also positively associated with anxious preoccupation. This relationship was not mediated by perceived social support. Cognitive avoidance was unrelated to both attachment dimensions and social support.

Conclusions

The findings highlight that the differences in coping repertoire are associated with social relatedness factors, specifically attachment security and its relationship to perceived social support. Implications of the findings are discussed.

KEYWORDS

Adult attachment; brain neoplasms; cancer; coping; oncology; emotional adjustment; social support

BACKGROUND

Primary brain tumours (BT) comprise a mixed group of benign and malignant neoplasms arising from intracranial and surrounding tissues, with a 1-year incidence rate of approximately 10 per 100,000[1]. Survival rates vary greatly, depending on the type of BT diagnosis, for instance only 5% of those diagnosed with glioblastoma will survive to 5 years[2]. Individuals living with BTs experience exceptionally high distress[3] and different challenges compared to other oncology patients[4], with a potentially high symptom burden including motor, visual, and memory deficits[3]. Qualitative explorations of the experiences of individuals with BTs[5] reveal that the diagnosis is associated with frightening and surreal feelings, and loss across physical, psychological, practical and social domains. The 'double threat'[6] presented by a BT diagnosis encompasses not only reflections on one's own mortality, but also the compounding threat of self-defining qualities such as personality and cognitive abilities being impacted by treatment or disease advancement[7]. BTs that cause damage to fronto-limbic areas have also been reported to alter longstanding cognitive and emotional patterns and therefore impact closeness in relationships[8]. The high levels of clinical depression[9], and higher psychosocial burden reported in individuals with a BT compared to other cancers[10] highlight the distress experienced as a result of these multiple stressors.

Within the stress and coping model[11], coping is conceptualised as a multifaceted phenomenon describing how humans think, feel, and act in a specific stressful situation, with the aim of reducing the level of perceived stress. The association between coping strategies and psychological well-being has been well documented, and supports the view that specific coping strategies can moderate the development of psychological distress[12-14]. Individuals living with BTs have been reported to use a wide range of coping strategies such as optimism and positive thinking/reappraisal[12,15], problem-solving[12,13], trust[12], acceptance[13], but also distancing, self-controlling, and escape avoidance[15]. As coping has implications for mental health and psychological well-being[16], a need for research exploring the psychological determinants of optimal coping in this group has been highlighted[17]. The current study employed the commonly used classification of cognitive and behavioural responses to cancer, which includes five

distinct coping styles[18]. *Helplessness/hopelessness* identifies behaviours and cognitions characterised by a sense of uncontrollability of illness and unavoidability of a negative outcome. *Anxious preoccupation* is characterised by excessive anxiety about diagnosis and possible recurrence. *Fighting spirit* relates to an attitude of optimism when confronted with a realistic appraisal of the illness, perception of diagnosis as a challenge and taking an active role in therapy. *Cognitive avoidance* assesses individuals' tendency to actively avoid thinking about the diagnosis and its implications. *Fatalism* indicates resignation and passive acceptance of the illness and therapy.

Attachment theory has been proposed to be integrated with the coping model as an explanatory component[19]. Attachment theory is fundamentally a theory of distress regulation[20], therefore it provides a theoretical framework to assist in elucidating mechanisms of coping in individuals with diagnoses that are associated with high levels of negative arousal. A diagnosis of a BT is likely to activate the attachment system, which works to trigger the implicit patterns of coping that were learned in early childhood. Originally developed by Bowlby[21], attachment theory posits that the internal working model – a socio-cognitive-emotional model that originates from early caregiver interactions – endures as a guiding model for self-regulatory behaviour, including responses to stress and the propensity to use significant others as support mechanisms. The emerging cognitive and emotional patterns remain potent in adulthood, particularly in romantic relationships[20]. In adults, two orthogonal dimensions of attachment insecurity have been identified: continuous measures of anxiety and avoidance[22]. Attachment anxiety relates to fear of being rejected by others and intense efforts to (re)gain proximity[20]. Attachment avoidance relates to feeling uncomfortable with intimacy and excessive self-reliance[20]. It has been demonstrated that, when faced with a cancer diagnosis, both more anxiously and avoidantly attached persons have poorer outcomes in their psychological adjustment, their ability to perceive and access social support[23], and experience higher depressive and anxiety symptoms[24]. A cross-sectional study investigating the relationship between attachment and coping in people with cancer found that attachment anxiety was associated with helplessness/hopelessness and anxiously preoccupied coping, while social support explained more variance in fighting spirit and fatalism[25]. The first aim of the current

study was to further explore the relationships between attachment insecurity and coping strategies.

Social relatedness is a key component of the attachment mechanism and a strong known resource in positive adjustment to cancer[26]. Social support has been proposed in the literature as offering a potential explanation for the established association between attachment style and psychological outcomes when coping with ill health[27]. The negative evaluation of perceived social support has been shown to be related to less adaptive coping strategies being employed[28]. For example, several studies found a mediating role of social support in the relationship between attachment style and depression or negative affect in cancer populations[29,30]. The second aim was therefore to assess the role of perceived social support as a mediating mechanism in the relationship between attachment dimensions and coping styles.

We hypothesised that attachment insecurity dimensions will be positively associated with helplessness/hopelessness, anxious preoccupation and cognitive avoidance coping strategies, and that they will be negatively associated with fighting spirit and fatalism. In addition, we hypothesised that social support will mediate the relationships between attachment insecurity dimensions (anxiety and avoidance) and the five coping strategies.

METHODS

Participants

Participants were invited to take part in the study if they were diagnosed with a primary BT regardless of grade and stage of illness, were over 18 years of age, and fluent in English. Participants were excluded if they were diagnosed with any other type of primary cancer.

Procedure

Ethical approval for the project was granted by Queen Margaret University Research Ethics Panel. Participants were recruited online with the support of relevant charitable organisations. The survey was hosted in the UK by the secure Online Survey platform. Supporting

organisations in English-speaking countries were contacted via e-mail; those who agreed to do so advertised the study on their websites and social media channels, detailing the inclusion criteria and providing a link to the survey website. A list of participating organisations is provided in the supplementary materials. The link was subsequently shared using a snowball sampling strategy. Recruitment took place between December 2016 and July 2017. Those wishing to take part in the study were asked to indicate their consent by clicking on the 'Agree' box, confirming they met the inclusion criteria and had read and understood the information sheet. The subsequent pages included demographic and clinical questions and questionnaires.

Measures

Coping

The *Mini–Mental Adjustment to Cancer Scale* (Mini-MAC[18]) is a 29-item questionnaire, designed to assess specific psychological coping styles in relation to cancer. It measures the extent to which individuals adopt each of the five dimensions of coping in their adjustment process. Responses are rated on a 4-point Likert scale ranging from 1 (definitely does not apply to me) to 4 (definitely applies to me). In the present study, the scale was adapted by replacing the word "cancer" with "brain tumour" in four questions, with permission from the scale's author, in order to be inclusive of participants with non-cancerous tumours. Internal consistencies (Cronbach's α) in the current sample were: helplessness/hopelessness=.90; anxious preoccupation=.87; fighting spirit=.52; cognitive avoidance=.75; fatalism=.55. The internal consistencies of fighting spirit and fatalism were too low and therefore unreliable in measuring the underlying construct, and thus no further analyses were undertaken with these subscales. For comparison, in the original validation study[18] the internal consistencies were: helplessness/hopelessness=.87; anxious preoccupation=.88; fighting spirit=.76; cognitive avoidance=.74; fatalism=.62.

Adult attachment

Experiences in Close Relationships–Revised questionnaire (ECR-R[31]) is a 36-item self-report scale measuring attachment security on two orthogonal dimensions of attachment anxiety and attachment avoidance. Participants were asked how they feel and behave in close relationships generally. Items are rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Lower scores on anxiety and/or avoidance dimensions indicate more secure attachment. Dimensions in the current sample had good internal consistency (Cronbach's α = .95 for both attachment anxiety and avoidance).

Social support

The *modified Medical Outcomes Study–Social Support Scale* (mMOS-SSS[32]) is an 8-item scale, designed to assess perceived social support (if needed) in patients with chronic health conditions. Respondents rate availability of support on a scale of 1 (none of the time) to 5 (all of the time). Cronbach's α value was .92, indicating good internal consistency. Higher scores indicate greater perceived social support.

Physical health status was measured by a 7-item *Physical well-being* (PWB) subscale of Functional Assessment of Cancer Therapy–Brain questionnaire (FACT-Br[33]). FACT-Br was validated to assess functional status in patients with a primary BT. Responses are provided on a 4-point Likert scale ranging from 0 (not at all) to 4 (very much). The scale was employed in order to reflect the degree to which participants' physical symptoms were bothersome. Higher scores indicate better physical well-being. Internal consistency of the PWB subscale in the current sample was good, with Cronbach's α = .86.

Statistical analyses

Pearson correlation coefficients were produced to assess the relationships among the main study variables. According to Cohen's suggested guidelines for interpretation of the strength of Pearson's coefficients' effects[34], *r*= .10 to .29 was considered a small effect, *r*= .30 to .49 a medium effect, and *r*= .50 to 1.0 a large effect. A series of mediation analyses was conducted

to assess the mediating role of perceived social support in the relationship between attachment anxiety and avoidance and the coping styles. Data were analysed using SPSS v.23 with Hayes'[35] PROCESS v.3.0 macro. Bootstrapping analyses with 5,000 samples were employed. The indirect effect was considered significant if the 95% bias-corrected confidence intervals did not include 0. Completely standardised indirect effect beta values were used to determine the effect size for each indirect effect[36]. According to Kenny[37], Cohen's effect size standards are squared where mediation is concerned, and so the standards used in the current study were ab_{cs}=.01 (small effect), ab_{cs}=.09 (medium effect) and ab_{cs}=.25 (large effect).

RESULTS

Descriptive analyses

There were 494 questionnaire responses. Fourteen cases were removed for the following reasons: completed survey twice (10; identified by the unique identifying code and key demographic data); failing to meet inclusion criteria (2) or meeting exclusion criteria (2). The 480 remaining participants ranged in age from 18 to 80 years (mean=43.76; SD=11.24). The majority of participants were from the UK or USA (38% and 37% respectively), the remainder from Canada, Ireland, Australia or other. University education was held by 42% of participants, 54% were in employment, 68% were in a relationship, 94% were of White ethnic origin. Medical characteristics of the sample are summarised in Table 1. Over seventy per cent of the sample were in a stable stage of illness. Missing data across questionnaires' subscales ranged from 0% to 1%. Cases with missing data were excluded from the relevant analyses using listwise deletion method, meaning that sample size for each analysis reflected the complete data.

Correlational analyses

Table 2 presents means, standard deviations and Pearson correlations for the study variables. The helplessness/hopelessness subscale was positively correlated with both attachment dimensions (r=.40, p<.001, medium effects for both anxiety and avoidance) and was negatively associated with perceived social support (r=-.37, p<.001, medium effect). Anxious

preoccupation was positively correlated with both attachment dimensions (r=.27 and .20 for anxiety and avoidance respectively, both p<.001, small to medium effects). There was also a relationship of increased preoccupied coping strategy and lower perceived social support (r=-.23, p<.001, small to medium effect). All of the above effects remained significant after applying a Bonferroni's correction to account for the multiple comparisons. Higher cognitive avoidance was associated with higher scores on both dimensions of attachment insecurity (r=.13, p=.005 for anxiety; and r=.10, p=.027 for avoidance, small effects). Cognitive avoidance was the only coping strategy not related significantly to social support. The relationships with cognitive avoidance did not remain significant following Bonferroni's correction.

Mediation analyses

Mediation analyses were conducted to examine the direct and indirect effects of attachment insecurity on the coping strategies, with perceived social support as a mediator. The results of the mediation analyses are summarised in Table 3 (models M1-M6). Separate models were constructed for attachment-anxiety and attachment-avoidance. Each mediation model was controlled for the relevant variables which were significant at p<.10 level in the univariable regression models' stage (see supplementary material) and for the effect of an orthogonal attachment dimension. The assumptions of linear regression, including lack of multicollinearity, were met. Where participants reported tumour grade as 'unknown' these were excluded from the analysis.

Models 1-2 show the direct and indirect effect of attachment on helplessness/hopelessness. Control variables were age, relationship status, tumour grade, physical well-being. Both models 1 and 2 accounted for 37%, respectively, of the variance in helplessness/hopelessness scores among the participants, $F(7,391)=33.11$, p<.001 (M1); $F(7,391)=33.11$, p<.001 (M2). The relationship between higher attachment anxiety and higher helplessness/hopelessness was significantly mediated by lower perceived social support (ab_{cs}=.03, small to medium effect) (Figure 1, M1). The relationship between higher attachment avoidance and higher

helplessness/hopelessness was also mediated by lower social support (ab_{cs}=.03, small to medium effect) (Figure 1, M2). Attachment anxiety was positively associated with anxious preoccupation, b=0.85, p=.001 (M3). This relationship, however, was not mediated by social support. Further, there was no significant direct effect of attachment avoidance on anxious preoccupation, and no mediating role of social support in this relationship (M4). Both models were controlled for age, gender, tumour grade, time since diagnosis, physical well-being. Cognitive avoidance was not associated with either of the two attachment dimensions, nor to the social support scores, while controlling for age, gender, physical well-being (M5-6).

DISCUSSION

Despite its relevance for understanding how individuals cope with distress[20], an attachment framework has rarely been applied to understanding how individuals with a BT cope with the diagnosis and its associated concerns. The results of this study indicate that an individual's attachment representations have implications for the coping strategies that they will likely employ. The results indicate that high levels of attachment anxiety were associated with the helplessness/hopelessness and anxious preoccupation strategies, and that high levels of attachment avoidance were associated with a helpless/hopeless stance. Perceived social support partially explained the relationships between both attachment dimensions and helplessness/hopelessness, however the association of attachment anxiety with anxious preoccupation was not mediated by social support. Neither attachment nor social support were statistically associated with the cognitive avoidance style.

Higher levels of helplessness/hopelessness indicate little expectation of a positive treatment outcome and a feeling that illness is unmanageable[18]. An explanation for the current findings may lie in the previously demonstrated tendency for people with higher attachment anxiety to feel more vulnerable and hypervigilant to potential threat, and to have a tendency to exaggerate negative emotions[38,39]. Individuals with high attachment anxiety also display pessimism about their own capacity to cope with negative emotion[40]. As a consequence, this may lead anxiously attached individuals to feel overwhelmed by the illness experience and to adopt the

helpless/hopeless coping response. Avoidant attachment, on the other hand, is known to be related to suppression of feelings of sadness, and down-regulating of emotions[39]. Although such strategies tend to be beneficial in the short-term, studies have shown them to be inefficient in the long-term[41] or after a certain threshold of distress is exceeded[42]. Thus, a BT diagnosis may be so threatening as to deem emotion regulation strategies used by avoidant individuals as not sufficient and, consequently, individuals higher on attachment avoidance also adopted helpless/hopeless coping in the current study.

The relationships between both dimensions of attachment insecurity and the helplessness/hopelessness coping style were mediated by social support. This highlights that although attachment insecurity is associated with feelings of unavoidability of negative outcome, this relationship can be partly explained by how much support individuals feel that they have available. A potential explanation is that a threatening diagnosis creates more emotional pressure, increases feelings of vulnerability, and has detrimental effects on the self-view[26], and so makes the perceptions of social support not being available more pronounced. The relationship between higher anxious attachment and higher helplessness/hopelessness being partially explained by lower perceived social support confirms the previous assumptions that anxiously attached persons have a tendency to feel less sure of their social relations, perceive support as unavailable and seek others' proximity for comfort, which would appear are important factors in determining their coping response.

Anxious preoccupation was directly positively associated to anxious attachment only, which coincides with Cicero et al.'s[25] findings. The tendency of anxiously attached persons to react to threat faster and more intensely, and to ruminate[38] may explain the association to this coping style. Unsurprisingly, attachment avoidance characterised by suppressing emotional reactions and vulnerability was not predictive of worrying about the diagnosis as observed in anxious preoccupation coping.

Cognitive avoidance involves making an active effort to avoid thinking about the diagnosis[18]. Neither attachment dimensions nor social support was statistically related to this coping style.

Attachment avoidance has been related to emotional suppression[42], but self-report measures often do not show this expected relationship[40]. This could be because those avoidantly attached present an invulnerable image and may report themselves as more secure than they are, or because denial is taking place at a subconscious level, so people are not even aware they are adopting this strategy. Individuals with higher levels of attachment avoidance also tend to appraise stress events as threatening, but tend to assess their ability to cope as higher[43]. The lack of association between attachment anxiety and cognitive avoidance may be explained by the threat-focused style associated with this dimension, making disengagement difficult.

The mean scores of helplessness/hopelessness and anxious preoccupation in the current sample were higher than in the normative group with heterogeneous cancer at early stages of disease[18]. Although those differences were not assessed statistically, they suggest that a BT diagnosis elicits a stronger sense of uncontrollability and excessive anxiety compared to other types of cancer, contrary to more positive coping responses reported in the previous literature[12,13].

Study limitations

A limitation of this study was reliance on a cross-sectional self-report design which prevents establishing the causality of the observed effects. Further, due to the recruitment being via support organisations, participants constitute a population already taking an active part in their illness journey by seeking support online. The majority of participants also reported being in a 'stable' stage of illness, which limits generalisability to those with more advanced stages of illness. A further limitation of the self-report method is that diagnosis/stage could not be confirmed through access to medical records. Although self-report physical health status was used as control variable, the possibility that neurocognitive functioning could be a potential confounding factor cannot be ruled out. It should also be noted that neurocognitive symptoms of individuals with BT can have implications for changes in how they relate to others. Assumptions about attachment as a pre-illness construct, therefore, need to be treated with caution.

Clinical implications

The current findings seem to suggest that individuals cope with a diagnosis of BT differently dependent on their attachment style. This has implications for theoretically explaining individual differences in adjustment, but also potentially for applying attachment theory to improve communication in clinical practice. The findings indicate that people with more insecure attachment (anxious and/or avoidant) styles may need more tailored support due to the higher likelihood for them to adopt more helpless/hopeless, preoccupied or avoidant coping responses.

Conclusions

In conclusion, the current study found that each attachment dimension was associated with a specific coping style: those higher on attachment anxiety showed a tendency towards helplessness/hopelessness and anxious preoccupation coping, while those more avoidantly attached tended to display higher helplessness/hopelessness. Relationships to helplessness/hopelessness were partially explained by the perceptions of social support. Due to the established associations between attachment insecurity and reduced well-being[36], the current findings on coping warrant further research attention.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest

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TABLES

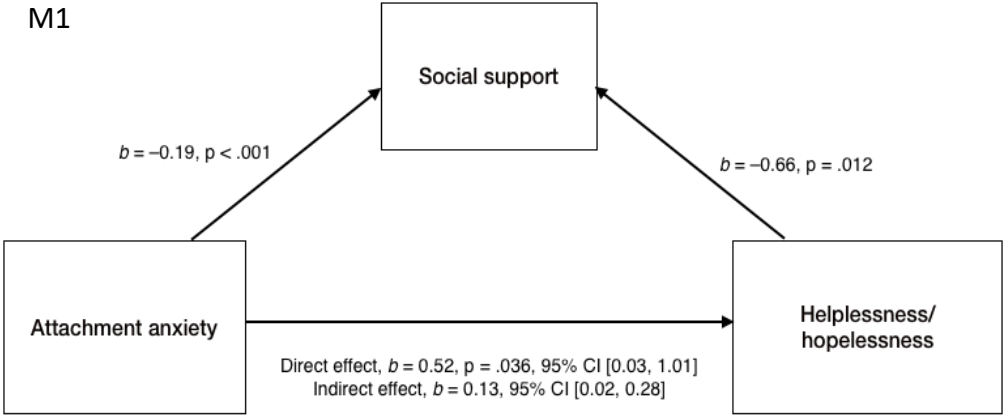
Table 1. Clinical characteristics of study participants (n=480)

Table 2. Means, standard deviations and Pearson correlation coefficients matrix among the main variables (n = 480)

Table 3. Mediation analysis models examining the indirect effects of insecure attachment on coping strategies, via perceived social support

FIGURES

Figure 1. Models of the relationship between attachment insecurity and helplessness/hopelessness, mediated by social support.



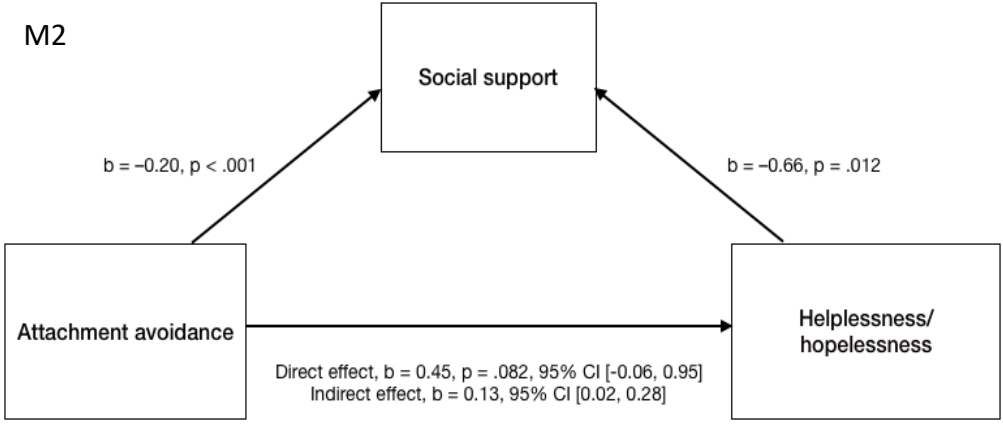


Table 1. Clinical characteristics of study participants (n=480)

Variable	n	Proportion
Tumour grade (%)		
Low (1 & 2)	284	59.2%
High (3 & 4)	120	25%
Unknown	76	15.8%
Tumour types (%)		
Meningioma	166	34.6%
Astrocytoma (other than GBM)	77	16%
Oligodendroglioma	59	12.3%
Glioblastoma multiforme (GBM)	57	11.9%
Acoustic neuroma	15	3.1%
Pituitary adenoma	10	2.1%
Ependymoma	9	1.9%
Craniopharyngioma	9	1.9%
Epidermoid	8	1.7%
Other types	53	11%
Unsure	17	3.5%
Illness duration (months) {median (IQR); range}	34 (15,81) (1-393)	
Treatment		
Surgery (yes)	362	75.4%
C*hemotherapy (yes)*	148	30.8%
Radiotherapy (yes)	207	43.1%
No treatment (yes)	65	13.5%
Self-reported stage of illness progression (%)		
Recently diagnosed	13	2.7%
Undergoing active treatment	84	17.5%
Stable disease or 'watch and wait'	337	70.2%
Disease progressing	21	4.4%
No further treatment possible	25	5.2%

Table 2. Means, standard deviations and Pearson correlation coefficients matrix among the main variables (n = 480)

		Mean	SD	1	2	3	4	5	6	7	8
	1.Age	43.76	11.24	1	.10	-.20*	-.09	-.01	-.09	-.15*	-.13
FACT-Br	2.Physical well-being	18.21	6.32		1	-.25*	-.26*	.28*	-.51*	-.45*	-.14
ECR-R	3.Attachment-Anxiety	3.08	1.37			1	.76*	-.52*	.40*	.27*	.13
	4.Attachment-Avoidance	3.15	1.31				1	-.54*	.40*	.20*	.10
mMOS-SSS	5.Social Support	3.68	1.00					1	-.37*	-.23*	-.05
Mini-MAC	6.Helplessness/ Hopelessness	14.89	5.15						1	.66*	.12
	7.Anxious Preoccupation	21.48	5.30							1	.26*
	8.Cognitive Avoidance	10.28	2.52								1

Note. *p < .05 significance after Bonferroni correction.

Table 3. Mediation analysis models examining the indirect effects of insecure attachment on coping strategies, via perceived social support

	Unstandardised Coefficient	*SE b*	95% CI (LL,UL)
M1. Attachment anxiety on helplessness/hopelessness (n=399)			
Total effect	0.65**	0.24	0.17,1.13
Direct effect	0.52*	0.25	0.03,1.01
Indirect effect via social support	0.13*	0.07	0.02,0.28
R^2	.37		
M2. Attachment avoidance on helplessness/hopelessness (n=399)			
Total effect	0.58*	0.25	0.08,1.07
Direct effect	0.45	0.26	–0.06,0.95
Indirect effect via social support	0.13*	0.07	0.02,0.28
R^2	.37		
M3. Attachment anxiety on anxious preoccupation (n=399)			
Total effect	0.85**	0.26	0.34,1.36
Direct effect	0.77**	0.27	0.25,1.29
Indirect effect via social support	0.08	0.06	–0.04,0.22
R^2	.27		
M4. Attachment avoidance on anxious preoccupation (n=399)			
Total effect	–0.31	0.27	–0.83,0.22
Direct effect	–0.38	0.27	–0.92,0.15
Indirect effect via social support	0.08	0.07	–0.03,0.23
R^2	.26		
M5. Attachment anxiety on cognitive avoidance (n=475)			
Total effect	0.14	0.13	–0.11,0.39
Direct effect	0.15	0.13	–0.11,0.41
Indirect effect via social support	–0.01	0.03	–0.07,0.05
R^2	.04		
M6. Attachment avoidance on cognitive avoidance (n=475)			
Total effect	0.01	0.13	–0.25,0.27
Direct effect	0.03	0.14	–0.24,0.30
Indirect effect via social support	–0.01	0.01	–0.03,0.02
R^2	.04		

*p<.05, **p<.01